

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Haase, Richard A.

Filed: March 1, 2004

Title: Water Combustion Technology -
Methods, Processes, Systems and
Apparatus for the Combustion of
Hydrogen and Oxygen

§ Serial No.: 10/790,316
§
§ A continuation of PCT/US 03/11250
§ and PCT/US 03/41719
§
§ Claiming Priority of:
§ PCT/US 03/11250 filed 4/10/03,
§ PCT/US 03/41719 filed 10/11/03,
§ 60/447,880 filed 2/14/03,
§ 60/404,644 filed 8/19/02,
§ 60/379,587 filed 5/10/02, and
§ 60/371,768 filed 4/11/02.

DECLARATION OF MR. CHESTER A. VAUGHAN

My name is Mr. Chester A. Vaughan. I am of sound mind and am capable of making this Declaration based on the facts stated herein.

1. I have a BS degree in Mechanical Engineering from Virginia Polytechnic Institute (VA Tech) and over 50 years of experience in the Aerospace industry. I worked for the NASA (National Aeronautics and Space Administration) for over 40 years. Most of that time I worked in the technical disciplines associated with space propulsion and power systems dealing with high energy propellants and reactants and the associated hardware to make those system function efficiently and safely on manned spacecraft. I worked on the Gemini, Apollo, Skylab, Space Shuttle and the International Space Station systems. Also, during that time, I spent approximately 10 years managing a test facility that dealt with rocket engines, pyrotechnic devices, cryogenic fluids (Oxygen, Hydrogen, Nitrogen and Helium), hydraulic systems and turbine and internal combustion engines. After retiring from NASA, I worked for 10 years with The Boeing Company on the International Space Station Program. All of my employment time at Boeing was spent in the International Space Station Chief Engineers Office and I was the Chief Engineer when I retired.
2. I have entered into an agreement with Richard Haase and ClearValue, Inc. to provide expertise in relation to an engine method and device for which Mr. Richard Haase has a patent pending under U.S. Patent Application 10/790,316. While I do not normally

perform consulting, my billing rate to ClearValue, Inc. for these services is agreed to be \$200.00 and that is the rate which I have agreed upon with Mr. Haase. My fee is not contingent upon any results that I obtain but is for my professional services. I personally know of Richard Haase through acquaintances in my field of work. I have no affiliation with him or his company, ClearValue, Inc. and have no interest in the outcome of patent application of Mr. Richard Haase.

3. Based on my experience, I believe I should be viewed as someone of expert skill in the art of combustion science and engineering. Based on my review of Mr. Haase's patent application, and technical discussions with Mr. Haase, I believe that this patent includes a unique approach to solving a problem which would *satisfy a long felt need for humanity, a combustion process without the combustion byproducts of nitrogen and carbon (Carbon Monoxide, Carbon Dioxide, Oxides of Nitrogen, etc.) while still producing efficient shaft power with most of the desirable features of the current Internal Combustion Engine.* The use of pure Oxygen instead of air eliminates the dilution effect of nitrogen which allows significant lower peak combustion pressure for the same torque when compared with the current internal combustion engines (or higher torque with comparable peak combustion pressure). While, the industry has pursued and is pursuing, options such as pollution control equipment on the current Internal combustion engines, battery and fuel cell electric motor driven systems (including hybrids) to deal with this long felt need for humanity, they all have significant disadvantages when compared with the concept described by Mr. Haase in his patent application (U. S. Patent Application 10/790,316). The following is a more detailed discussion of the pertinent features and benefits of the patent:

- a. A method of hydrogen combustion which produces no oxides of carbon and no oxides of nitrogen has been a long felt need of humanity; no solution has been previously presented. Previous and on-going attempts of others to solve this long felt need include, but are not limited to, fuel cells, batteries and electric motors and the combustion of hydrogen with air. Fuel cells, utilizing air for its source of oxygen, are less desirable due to many factors including, but not limited to: equipment cost, platinum availability, and the production of oxides of nitrogen. Combustion of hydrogen with air is proving a challenge due to the production of

oxides of nitrogen and due to the available torque per cubic inch of displacement. This is all while the environmental consequences increase daily of humanity's combustion of hydrocarbon fuel. I would also state that said long felt industry need has been known by those of ordinary skill in the art, as well as those of expert skill in the art, of combustion engines and of combustion furnaces for a considerable time previous to the priority date of Mr. Haase's patent application, U.S. Patent Application 10/790,316.

- b. A method of hydrogen combustion which produces little to no oxides of carbon nor of nitrogen has been a long felt need which has been known by those of ordinary and of expert skill in the art of combustion and of turbo-machinery for many years, wherein there has not been previously presented a solution.
- c. At this time there is no known method or apparatus to combust hydrogen with a pure form of oxygen without storage of oxygen, a rather combustible and dangerous material to store.
- d. I would state that a method or apparatus to combust hydrogen with a pure form of oxygen, as described in U.S. Patent Application 10/790,316 and claimed therein, answers said long felt need.
- e. As I have read and understand, the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air as a means to provide a pure form of oxygen to combustion. It is my opinion that this technique and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
- f. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air to provide a pure form of oxygen to combustion. It is my understanding that this approach will increase the amount of hydrogen and of oxygen in the combustion chamber, thereby improving available

torque per cubic inch of combustion chamber. It is my opinion that this technique and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.

- g. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air to provide a pure form of oxygen to combustion while using the available cryogenic nitrogen as a means of reducing the temperature of stored hydrogen to a temperature below the joule Thompson curve of hydrogen, thereby improving the storage effectiveness of hydrogen. It is my opinion that this approach and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
 - h. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, the techniques and methods discussed above, including the benefits can be applied to jet engines, e.g. turbo-machinery. It is my opinion that this technique and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
 - i. While the invention and apparatus described by Mr. Haase and the U.S, Patent Application 10/790.316 represent significant advantages over the current approaches, they also represent some significant development challenges which must be overcome to be successful. However, with advances in materials technology, control technology, etc., I believe the patent should be granted and the concept developed.
4. As combustion methods, engines and devices is a significant market and as there exist many marketed devices within the combustion, engine and turbo-machinery industries in combination with a world wide knowledge of the environmental consequences of hydrocarbon combustion methods, there should not previously nor today exist any lack of interest or lack of appreciation of an invention's potential or marketability to a method or apparatus as presented in the invention of Mr. Haase, U.S. Patent Application 10/348,071.

5. I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

Full Name of Declarant: Mr. Chester A. Vaughan

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Citizenship: USA

Mailing Address: Same as above

Date: September 25, 2007

Chester A. Vaughan 9/25/07
Signature of Declarant

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§ 60/379,587 filed 5/10/02, and
§ 60/371,768 filed 4/11/02.

DECLARATION OF MR. COLIN FRANCIS WALKER

My name is Mr. Colin Francis Walker. I am of sound mind and am capable of making this Declaration based on the facts stated herein.

1. I have been an engineer in the combustion industry with an emphasis on turbo-machinery since 1960. I am a founding member of the ASE Society of Materials Engineering while a member of the American Society of Mechanical Engineers (ASME), having authored papers therein for turbo-machinery repair. I am currently a practicing materials engineer for turbo-machinery.
2. I have entered into an agreement with Richard Haase and ClearValue, Inc. to provide expertise in relation to an engine method and device for which Mr. Richard Haase has patent pending under U.S. Patent Application 10/790,316. While I do not normally perform consulting, my billing rate to ClearValue, Inc. for these services is agreed to be \$1.00 and that is the rate which I have agreed upon with Mr. Haase. My fee is not contingent upon any results that I obtain but is for my professional services. I personally know of Richard Haase through acquaintances in my field of work. I have no affiliation with Applicant or his company, ClearValue, Inc. and have no interest in the outcome of patent application of Mr. Richard Haase.
3. I should be viewed as at least someone of ordinary skill in the art of combustion engineering and of turbo-machinery.

4. A method of hydrogen combustion which produces reduced to no oxides of carbon and reduced to no oxides of nitrogen has been a long felt need of humanity; there has not been previously presented a solution. Previous attempts and failure of others to solve this long felt need include, but are not limited to, fuel cells and the combustion of hydrogen with air. Fuel cells are proving impractical due to many factors including, but not limited to: equipment cost, platinum availability, and the production of oxides of nitrogen. Combustion of hydrogen with air is proving a challenge due to the production of oxides of nitrogen and due to the available torque per cubic inch of displacement. This is all while the environmental consequences increase daily of humanity's combustion of hydrocarbon fuel. I would also state that said long felt industry need has been known by those of ordinary skill in the art, as well as those of expert skill in the art, of combustion engines and of combustion furnaces for a considerable time previous to the priority date of Mr. Haase's patent application, U.S. Patent Application 10/790,316.
5. A method of hydrogen combustion which produces little to no oxides of carbon nor of nitrogen has been a long felt need which has been known by those of ordinary and of expert skill in the art of combustion and of turbo-machinery for many years, wherein there has not been previously presented a solution.
6. At this time there is no known method or apparatus to combust hydrogen with a pure form of oxygen without storage of oxygen. This is while oxygen is a rather combustible and dangerous material to store.
7. I would state that a method or apparatus to combust hydrogen with a pure form of oxygen, as taught in U.S. Patent Application 10/790,316 and claimed therein, answers said long felt need.
8. As I have read and understand, the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air as a means to provide a pure form of oxygen to combustion. It is my opinion that this teaching and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.

9. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air to provide a pure form of oxygen to combustion. It is my understanding that this teaching will increase the amount of hydrogen and of oxygen in the combustion chamber, thereby improving available torque per cubic inch of combustion chamber. It is my opinion that this teaching and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
10. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with a pure form of oxygen, wherein a portion of the combustion energy is used to cryogenically distill air to provide a pure form of oxygen to combustion while using the available cryogenic nitrogen as a means of reducing the temperature of stored hydrogen to a temperature below the joule Thompson curve of hydrogen, thereby improving the storage effectiveness of hydrogen. It is my opinion that this teaching and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
11. As I have read and understand the invention of Mr. Haase, U.S. Patent Application 10/790,316, proposes a method and an apparatus to combust a pure form of hydrogen with an excess amount of air so as to use the combustion envelop of hydrogen in combination with an amount of air in excess of that required to perform combustion as a means of cooling combustion and thereby reduce the formation of oxides of nitrogen. I also understand that the invention of Mr. Haase, 10/790,316, preferably proposes this teaching for jet engines, e.g. turbo-machinery. It is my opinion that this teaching and the claims therein answer a long felt industry need known by those of ordinary and of expert skill in the art, as well as a long felt need of humanity.
12. As combustion methods, engines and devices is a significant market and as there exist many marketed devices within the combustion, engine and turbo-machinery industries in combination with a world wide knowledge of the environmental consequences of

hydrocarbon combustion methods, there should not previously nor today exist any lack of interest or lack of appreciation of an invention's potential or marketability to a method or apparatus as presented in the invention of Mr. Haase, U.S. Patent Application 10/348,071.

13. I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issued thereon.

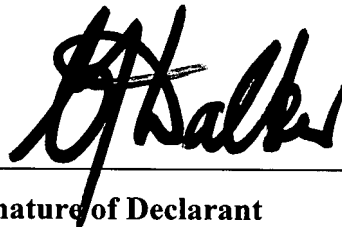
Full Name of Declarant: Mr. Colin Francis Walker

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Date: September 20, 2007



Signature of Declarant